JC07 Rec'd PCT/PTO 28 FEB 2002

FORM PTO-1390 (REV. 5-93)	U.S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 10191/2243
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 10/070114

INTERNATIONAL APPLICATION NO. PCT/DE00/02637	INTERNATIONAL FILING DATE (08.08.00) 08 August 2000	PRIORITY DATES CLAIMED (31 08.99) 31 August 1999

TITLE OF INVENTION
CONNECTING PIECE FOR CONNECTING A WIPER BLADE WITH A WIPER ARM

APPLICANT(S) FOR DO/EO/US
ROEKENS, Jurgen

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3))
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (unsigned)
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U S C 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
    ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☒ A substitute specification and marked up version of substitute specification..
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information. Copies of International Search Report, Preliminary Examination Report and Form PCT/RO/101.

EXPRESS NO. EL594613710

JC19 Rec'd PCT/PTO 28 FEB 2002

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1) 10/070114	INTERNATIONAL APPLICATION NO PCT/DE00/02637	ATTORNEY'S DOCKET NUMBER 10191/2243

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO . . . . . $890.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) . . . . $710.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) . . . . . $740.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO . . . . . $1,040.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$890	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

Claims	Number Filed	Number Extra	Rate		
Total Claims	9 - 20 =	0	X $18.00	$	
Independent Claims	1 - 3 =	0	X $84.00	$	
Multiple dependent claim(s) (if applicable)			+ $280.00	$	
TOTAL OF ABOVE CALCULATIONS =				$890	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$	
SUBTOTAL =				$890	
Processing fee of $130.00 for furnishing the English translation later the ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$890	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED =				$890	
				Amount to be: refunded	$
				charged	$

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of **$890.00** to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-0600. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Kenyon & Kenyon
One Broadway
New York, New York 10004

By attorney Reg No. 35,252
SIGNATURE

Richard L. Mayer, Reg. No. 22,490
NAME

2/28/02
DATE

26646
PATENT TRADEMARK OFFICE

[10191/2243]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s)	:	Jurgen ROEKENS
Serial No.	:	To Be Assigned
Filed	:	Herewith
For	:	CONNECTING PIECE FOR CONNECTING A WIPER BLADE WITH A WIPER ARM
Examiner	:	To Be Assigned
Art Unit	:	To Be Assigned

Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT AND

37 C.F.R. § 1.125 SUBSTITUTE SPECIFICATION STATEMENT

SIR:

Please amend the above-identified application before examination, as set forth below.

IN THE SPECIFICATION AND ABSTRACT:

In accordance with 37 C.F.R. § 1.121(b)(3), a Substitute Specification (including the Abstract, but without claims) accompanies this response. It is respectfully requested that the Substitute Specification (including Abstract) be entered to replace the Specification of record.

IN THE CLAIMS:

Please cancel claims 1-9, without prejudice.

Please add the following new claims:

EL594613710

10. (New) A connecting piece for connecting a wiper blade with a wiper arm, comprising:

a body adapted to be connected with a wiper arm end;

means for receiving and supporting the wiper blade;

means for receiving a hook-shaped wiper arm end;

means for receiving a pin-type wiper arm end; and

at least one additional means for receiving another type of wiper arm end.

11. (New) The connecting piece according to claim 10, wherein the another type of wiper arm end is in the shape of a fork.

12. (New) The connecting piece according to claim 10, wherein the another type of wiper arm end is a strip-shaped wiper arm end having pegs in connection with a fork-shaped adapter that faces the connecting piece.

13. (New) The connecting piece according to claim 10, further comprising a flexible region that is fashioned as a plateau.

14. (New) The connecting piece according to claim 13, wherein the means for receiving and supporting the wiper blade that bear the plateau have slots, in such a way that a springy cross sectional structure arises that is formed by at least one crosspiece.

15. (New) The connecting piece according to claim 13, wherein the plateau lies in a plane to which the at least crosspiece has an angle of less than 90°.

16. (New) The connecting piece according to claim 10, further comprising at least one flexible region having stops for limiting flexibility.

17. (New) The connecting piece according to claim 10, wherein the means for receiving and supporting the wiper blade has a hole that extends through it in a

transverse fashion, and further comprising an elastic clip situated in an opening formed by the hole.

18. (New) The connecting piece according to claim 10, wherein the body has at least one clamp-type projection for arresting a wiper arm end.

REMARKS

This Preliminary Amendment cancels without prejudice claims 1-9 in the underlying PCT Application No. PCT/DE00/02637, and adds new claims 10-18. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. Approval and entry of the Substitute Specification (including Abstract) is respectfully requested.

The underlying PCT Application No. PCT/DE00/02637 includes an International Search Report, dated December 27, 2000. The Search Report includes a list of documents that were uncovered in the underlying PCT Application. A copy of the Search Report accompanies this Preliminary Amendment.

Applicant asserts that the present invention is new, non-obvious, and useful. Prompt consideration and allowance of the claims are respectfully requested.

Respectfully Submitted,

KENYON & KENYON

By: Reg No 35,952

Dated: 2/28/02

By: _____
Richard L. Mayer
Reg. No. 22,490

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[10191/2243]

CONNECTING PIECE FOR CONNECTING A WIPER BLADE WITH A WIPER ARM

Background Information

Connecting pieces for connecting the wiper arm with the wiper blade are already known, for example from European Patent No. 0 863 058; however, the connecting piece presented there has a multipart construction, so that different adapter parts are used, partly according to the modular design system, for different wiper arms.

Summary Of The Invention

The connecting piece according to the present invention has the advantage that it can receive (accept) a multiplicity of standard types of wiper arm ends, and thus can also be used with a multiplicity of differently dimensioned wiper arms. In addition, it can be manufactured in one piece, for example, in an injection molding method, which results in a significant advantage during installation (assembly), because it is not necessary first to determine which adapter piece fits the wiper arm end in question. This is especially important in particular because, as a rule, the installation is carried out by the vehicle driver himself, i.e., by a layman, not an expert.

Due to the fact that the wiper arm end is constructed in the shape of a fork, there results a high degree of rigidity of the connection between wiper arm and wiper blade. In this way, the optimal angle between windshield and wiper blade can be precisely maintained.

A fitting adapter piece having a fork-shaped construction can also connect the connecting piece with a strip-shaped wiper arm end, as is standard for some wiper arms, without loss of rigidity.

If a region of the connecting piece is constructed as a flexible plateau, an especially high dimensional tolerance is achieved. If the flexibility of the plateau is due to

crosspieces that have an angle to the wiper arm of less than 90°, then when the connecting piece is removed from the wiper arm there results a self-arresting effect that further increases the strength of the connection between wiper arm and wiper blade.

Due to the fact that the flexible regions have stops for limiting the flexibility, a high degree of resistance to breaking is also ensured.

Through the clamp-type projections for arresting the wiper arms, a multiplicity of different wiper arms can be fastened securely to the wiper blade, since it is not necessary to use the arresting method used by the manufacturer of the wiper arm.

Brief Description Of The Drawings

Figure 1 shows a schematic view of a part of a wiper apparatus having the inventive connecting piece, in the installed position.

Figure 2 shows a box region of a center bracket of a wiper blade.

Figure 3 shows a hook-shaped wiper arm end.

Figure 4 shows a connecting piece according to the present invention and a pin-arm wiper arm end, in a perspective view.

Figures 5 and 6 show a connecting piece according to the present invention, each having a hook-shaped wiper arm end.

Figure 7 shows a connecting piece according to the present invention having a strip-type wiper arm end and a fork-shaped adapter, in a perspective view.

Figure 8 shows a section through an inventive connecting piece.

Figure 9 shows a section through an adapter.

Detailed Description

In Figure 1, a connecting piece 10 having a wiper arm 11 and a wiper blade 12 can be seen. In the installed position, the wiper blade lies on a windshield 13. Wiper arm 11 has two ends, its lower end being connected with a wiper motor 14. Its upper end standardly has either a hook-type wiper arm end (11a), a pin-type wiper arm end (11b), or a strip-type wiper arm end (11c).

In Figure 2, a box region 15 of a center bracket of a wiper blade 12 is shown. In this region there is located a connecting element 18, often a rivet or a roll rivet, that connects the body of connecting piece 10 with wiper blade 12. At the sides, box region 15 has various bored holes 21 that may have a border.

Figure 3 shows a hook-shaped wiper arm end. It has a hook-shaped 180° bend having radius R.

Figure 4 shows an inventive connecting piece 10 and a pin-type wiper arm end 11b. Pin-type wiper arm end 11b has a pin 24 that in the installed position lies parallel to the windshield and perpendicular to wiper arm 11, and whose diameter is diminished in a suitable segment.

The body of connecting piece 10 essentially has two side walls 30 that are held by three cross-connecting pieces 27a, 27b, and 27c, and that receive and support wiper blade 12 (see also Figure 8).

On the front side, facing away from wiper arm 11, of the connecting piece, side walls 30 extend beyond cross-connecting pieces 27a, b, c, and are terminated by raised parts 33. This results in a clamp-type projection 31 that is used to arrest hook-type wiper arm ends 11a.

Upper surface 27a is curved downward in the front region of the body, forming a radius 36.

On its lower side, which in the installed state faces the windshield, the connecting piece has a transverse groove 37 that tapers upward and that terminates with a cylindrical opening 38 that receives connecting element 18 of wiper blade 12.

In the rear region, facing the wiper arm, connection piece 10 has, on its side facing windshield 13, slots 40 in lateral walls 30, so that lower surface 27b is supported only by thin crosspieces 39, and thus forms a flexible plateau.

The direction of slots 40, and thus the direction of crosspieces 39, is usefully selected such that when connecting piece 10 is removed from wiper arm 11a, the adhesion of wiper arm 11a to lower surface 27c effects an increase of the contact pressure of lower surface 27c on wiper arm 11a.

This is achieved in that when connecting piece 10 is withdrawn from wiper arm 11a, the lowest surface 27c is moved slightly forward through its adhesion to wiper arm 11a. The angle of crosspieces 39 to the wiper arm, and thus the distance between upper surface 27a and lower surface 27c, is increased slightly by this, increasing the contact pressure of surface 27c against the bent over end of wiper arm 11a.

In order to limit flexibility, flexible region 41 has stops 44 that prevent crosspieces 39 from breaking off.

Above plateau 27c, connecting piece 10 has a hole 43 that extends through it transversely between the upper surface and the center surface. This hole 43 receives a pin-arm wiper arm 11b.

For this purpose, center surface 27b is interrupted by a tongue-type clip 45 that

extends from transverse groove 37 to behind hole 43, and that reduces the diameter of hole 43 inside the body of connecting piece 10. Clip 45 is bent upward behind hole 43, and subsequently has a pressure surface 48 that runs in parallel alignment to upper surface 27a.

If pin 24 of a pin-type wiper arm end 11b is now introduced into opening 43, clip 45 is first bent downward so that it will then snap upward, due to the diminished diameter, when pin 24 is located in the desired position, thus snapping wiper arm 11 into place.

On the upper surface, the connecting piece has two openings 52 that can be used to fasten an adapter 55.

In Figure 5, a connecting piece 10 having a hook-type wiper arm end 11a is shown in the installed position.

Figure 6 likewise shows a connecting piece 10 according to the present invention having a wiper arm 11a, but here wiper arm 11a has a larger radius R than in Figure 5. For this reason, the bent-off end slides under flexible plateau 27c, and presses this plateau slightly upward if necessary. Here the arresting via raised parts 33 of connecting piece 10 can be seen clearly.

Figure 7 shows a connecting piece 10 according to the present invention together with an adapter 55 and a strip-type wiper arm end 11c. Adapter 55 essentially has a long and a short longitudinal brace 58, 59, connected with one another by a transverse brace 62 in such a way that a fork-type structure results.

Figure 9 shows adapter part 55 in a sectional view. The long upper longitudinal brace 58 has on its lower side, in the front region facing connecting piece 10, an arresting tongue 65, to whose end teeth 68 are attached that arrest adapter 55 in

openings 52 of connecting piece 10. On the side of adapter 55 facing wiper arm 11, there is located an arm receptacle 71 made up of an opening and an arrest hole 74. Arm receptacle 71 is fashioned in such a way that a strip-shaped wiper arm 11c can be inserted and is arrested via a wiper arm peg 77 (tab) that snaps into arrest hole 74.

In the connection of adapter 55 with connecting piece 10, short longitudinal brace 59 is inserted into the area between center and lower surfaces 27b and c. Long longitudinal brace 58, having arrest tongue 65, of adapter 55 slides forward on upper surface 27a of connecting piece 10. In the snapped-in state, teeth 68 engage in openings 52.

It is also possible to attach an arrest pin to the lower side of short longitudinal brace 59; in the snapped-in state this bolt snaps into a hole located in the flexible plateau, i.e., surface 27c.

Abstract Of The Disclosure

A connecting piece for connecting a wiper arm with a wiper blade, having three different fastening systems for wiper arms, so that a multiplicity of wiper arms can be received.

[10191/2243]

CONNECTING PIECE FOR CONNECTING A WIPER BLADE WITH A WIPER ARM

Background Information

[The invention is based on a connecting piece for connecting a wiper blade and a wiper arm according to the preamble of main claim 1.

]Connecting pieces for connecting the wiper arm with the wiper blade are already known, for example from European Patent No. 0 863 058 [A2]; however, the connecting piece presented there has a multipart construction, so that different adapter parts are used, partly according to the modular design system, for different wiper arms.

[Advantages of the] Summary Of The Invention

[In contrast, the] The connecting piece according to the present invention [having the characterizing features of the main claim] has the advantage that it can receive (accept) a multiplicity of standard types of wiper arm ends, and thus can also be used with a multiplicity of differently dimensioned wiper arms. In addition, it can be manufactured in one piece, for example, in an injection molding method, which results in [an essential] a significant advantage during installation (assembly), because it is not necessary first to determine which adapter piece fits the wiper arm end in question. This is especially important in particular because, as a rule, the installation is carried out by the vehicle driver himself, i.e., by a layman, not an expert.

[Advantageous developments and improvements of the connecting piece indicated in the main claim result from the measures indicated in the subclaims.]

Due to the fact that the wiper arm end is constructed in the shape of a fork, there results a high degree of rigidity of the connection between wiper arm and wiper blade. In this way, the optimal angle between windshield and wiper blade can be

precisely maintained.

A fitting adapter piece having a fork-shaped construction can also connect the connecting piece with a strip-shaped wiper arm end, as is standard for some wiper arms, without loss of rigidity.

If a region of the connecting piece is constructed as a flexible plateau, an especially high dimensional tolerance is achieved. If the flexibility of the plateau is due to crosspieces that have an angle to the wiper arm of less than 90°, then when the connecting piece is removed from the wiper arm there results a self-arresting effect that further increases the strength of the connection between wiper arm and wiper blade.

Due to the fact that the flexible regions have stops for limiting the flexibility, a high degree of resistance to breaking is also ensured.

Through the clamp-type projections for arresting the wiper arms, a multiplicity of different wiper arms can be fastened securely to the wiper blade, since it is not necessary to use the arresting method used by the manufacturer of the wiper arm.

Brief Description Of The Drawings

[

In the following, the present invention is explained on the basis of an exemplary embodiment with associated drawings.

]Figure 1 shows a schematic view of a part of a wiper apparatus having the inventive connecting piece, in the installed position[,].

Figure 2 shows a box region of a center bracket of a wiper blade[,].

Figure 3 shows a hook-shaped wiper arm end[,].

MARKED-UP VERSION OF SUBSTITUTE SPECIFICATION

Figure 4 shows a connecting piece according to the present invention and a pin-arm wiper arm end, in a perspective view[,].

Figures 5 and 6 show a connecting piece according to the present invention, each having a hook-shaped wiper arm end[,].

Figure 7 shows a connecting piece according to the present invention having a strip-type wiper arm end and a fork-shaped adapter, in a perspective view[,].

Figure 8 shows a section through an inventive connecting piece[, and].

Figure 9 shows a section through an adapter.

Detailed Description [of the Exemplary Embodiment]

In Figure 1, a connecting piece 10 having a wiper arm 11 and a wiper blade 12 can be seen. In the installed position, the wiper blade lies on a windshield 13. Wiper arm 11 has two ends, its lower end being connected with a wiper motor 14. Its upper end standardly has either a hook-type wiper arm end (11a), a pin-type wiper arm end (11b), or a strip-type wiper arm end (11c).

In Figure 2, a box region 15 of a center bracket of a wiper blade 12 is shown. In this region there is located a connecting element 18, often a rivet or a roll rivet, that connects the body of connecting piece 10 with wiper blade 12. At the sides, box region 15 has various bored holes 21 that may have a border.

Figure 3 shows a hook-shaped wiper arm end. It has a hook-shaped 180° bend having radius R.

Figure 4 shows an inventive connecting piece 10 and a pin-type wiper arm end 11b. Pin-type wiper arm end 11b has a pin 24 that in the installed position lies parallel to

the windshield and perpendicular to wiper arm 11, and whose diameter is diminished in a suitable segment.

The body of connecting piece 10 essentially has two side walls 30 that are held by three cross-connecting pieces 27a, 27b, and 27c, and that receive and support wiper blade 12 (see also Figure 8).

On the front side, facing away from wiper arm 11, of the connecting piece, side walls 30 extend beyond cross-connecting pieces 27a, b, c, and are terminated by raised parts 33. This results in a clamp-type projection 31 that is used to arrest hook-type wiper arm ends 11a.

Upper surface 27a is curved downward in the front region of the body, forming a radius 36.

On its lower side, which in the installed state faces the windshield, the connecting piece has a transverse groove 37 that tapers upward and that terminates with a cylindrical opening 38 that receives connecting element 18 of wiper blade 12.

In the rear region, facing the wiper arm, connection piece 10 has, on its side facing windshield 13, slots 40 in lateral walls 30, so that lower surface 27b is supported only by thin crosspieces 39, and thus forms a flexible plateau.

The direction of slots 40, and thus the direction of crosspieces 39, is usefully selected such that when connecting piece 10 is removed from wiper arm 11a, the adhesion of wiper arm 11a to lower surface 27c effects an increase of the contact pressure of lower surface 27c on wiper arm 11a.

This is achieved in that when connecting piece 10 is withdrawn from wiper arm 11a, the lowest surface 27c is moved slightly forward through its adhesion to wiper arm

11a. The angle of crosspieces 39 to the wiper arm, and thus the distance between upper surface 27a and lower surface 27c, is increased slightly by this, increasing the contact pressure of surface 27c against the bent over end of wiper arm 11a.

In order to limit flexibility, flexible region 41 has stops 44 that prevent crosspieces 39 from breaking off.

Above plateau 27c, connecting piece 10 has a hole 43 that extends through it transversely between the upper surface and the center surface. This hole 43 receives a pin-arm wiper arm 11b.

For this purpose, center surface 27b is interrupted by a tongue-type clip 45 that extends from transverse groove 37 to behind hole 43, and that reduces the diameter of hole 43 inside the body of connecting piece 10. Clip 45 is bent upward behind hole 43, and subsequently has a pressure surface 48 that runs in parallel alignment to upper surface 27a.

If pin 24 of a pin-type wiper arm end 11b is now introduced into opening 43, clip 45 is first bent downward so that it will then snap upward, due to the diminished diameter, when pin 24 is located in the desired position, thus snapping wiper arm 11 into place.

On the upper surface, the connecting piece has two openings 52 that can be used to fasten an adapter 55.

In Figure 5, a connecting piece 10 having a hook-type wiper arm end 11a is shown in the installed position.

Figure 6 likewise shows a connecting piece 10 according to the present invention having a wiper arm 11a, but here wiper arm 11a has a larger radius R than in Figure

5. For this reason, the bent-off end slides under flexible plateau 27c, and presses this plateau slightly upward if necessary. Here the arresting via raised parts 33 of connecting piece 10 can be seen clearly.

Figure 7 shows a connecting piece 10 according to the present invention together with an adapter 55 and a strip-type wiper arm end 11c. Adapter 55 essentially has a long and a short longitudinal brace 58, 59, connected with one another by a transverse brace 62 in such a way that a fork-type structure results.

Figure 9 shows adapter part 55 in a sectional view. The long upper longitudinal brace 58 has on its lower side, in the front region facing connecting piece 10, an arresting tongue 65, to whose end teeth 68 are attached that arrest adapter 55 in openings 52 of connecting piece 10. On the side of adapter 55 facing wiper arm 11, there is located an arm receptacle 71 made up of an opening and an arrest hole 74. Arm receptacle 71 is fashioned in such a way that a strip-shaped wiper arm 11c can be inserted and is arrested via a wiper arm peg 77 (tab) that snaps into arrest hole 74.

In the connection of adapter 55 with connecting piece 10, short longitudinal brace 59 is inserted into the area between center and lower surfaces 27b and c. Long longitudinal brace 58, having arrest tongue 65, of adapter 55 slides forward on upper surface 27a of connecting piece 10. In the snapped-in state, teeth 68 engage in openings 52.

It is also possible to attach an arrest pin to the lower side of short longitudinal brace 59; in the snapped-in state this bolt snaps into a hole located in the flexible plateau, i.e., surface 27c.

MARKED-UP VERSION OF SUBSTITUTE SPECIFICATION

Abstract Of The Disclosure

A connecting [Connecting] piece [10] for connecting a wiper arm [11] with a wiper blade, having three different fastening systems for wiper arms [11], so that a multiplicity of wiper arms [11] can be received.

[(Fig. 7)]

MARKED-UP VERSION OF SUBSTITUTE SPECIFICATION

[10191/2243]

CONNECTING PIECE FOR CONNECTING A WIPER BLADE WITH A WIPER ARM

Background Information

The invention is based on a connecting piece for connecting a wiper blade and a wiper arm according to the preamble of main claim 1.

Connecting pieces for connecting the wiper arm with the wiper blade are already known, for example from European Patent 0 863 058 A2; however, the connecting piece presented there has a multipart construction, so that different adapter parts are used, partly according to the modular design system, for different wiper arms.

Advantages of the Invention

In contrast, the connecting piece according to the present invention having the characterizing features of the main claim has the advantage that it can receive a multiplicity of standard types of wiper arm ends, and thus can also be used with a multiplicity of differently dimensioned wiper arms. In addition, it can be manufactured in one piece, for example, in an injection molding method, which results in an essential advantage during installation, because it is not necessary first to determine which adapter piece fits the wiper arm end in question. This is especially important in particular because, as a rule, the installation is carried out by the vehicle driver himself, i.e., by a layman, not an expert.

Advantageous developments and improvements of the connecting piece indicated in the main claim result from the measures indicated in the subclaims.

Due to the fact that the wiper arm end is constructed in the shape of a fork, there results a high degree of rigidity of the connection between wiper arm and wiper

blade. In this way, the optimal angle between windshield and wiper blade can be precisely maintained.

A fitting adapter piece having a fork-shaped construction can also connect the connecting piece with a strip-shaped wiper arm end, as is standard for some wiper arms, without loss of rigidity.

If a region of the connecting piece is constructed as a flexible plateau, an especially high dimensional tolerance is achieved. If the flexibility of the plateau is due to crosspieces that have an angle to the wiper arm of less than 90°, then when the connecting piece is removed from the wiper arm there results a self-arresting effect that further increases the strength of the connection between wiper arm and wiper blade.

Due to the fact that the flexible regions have stops for limiting the flexibility, a high degree of resistance to breaking is also ensured.

Through the clamp-type projections for arresting the wiper arms, a multiplicity of different wiper arms can be fastened securely to the wiper blade, since it is not necessary to use the arresting method used by the manufacturer of the wiper arm.

Drawings

In the following, the present invention is explained on the basis of an exemplary embodiment with associated drawings.

Figure 1 shows a schematic view of a part of a wiper apparatus having the inventive connecting piece, in the installed position,

Figure 2 shows a box region of a center bracket of a wiper blade,

Figure 3 shows a hook-shaped wiper arm end,

Figure 4 shows a connecting piece according to the present invention and a pin-arm wiper arm end, in a perspective view,

Figures 5 and 6 show a connecting piece according to the present invention, each having a hook-shaped wiper arm end,

Figure 7 shows a connecting piece according to the present invention having a strip-type wiper arm end and a fork-shaped adapter, in a perspective view,

Figure 8 shows a section through an inventive connecting piece, and

Figure 9 shows a section through an adapter.

Description of the Exemplary Embodiment

In Figure 1, a connecting piece 10 having a wiper arm 11 and a wiper blade 12 can be seen. In the installed position, the wiper blade lies on a windshield 13. Wiper arm 11 has two ends, its lower end being connected with a wiper motor 14. Its upper end standardly has either a hook-type wiper arm end (11a), a pin-type wiper arm end (11b), or a strip-type wiper arm end (11c).

In Figure 2, a box region 15 of a center bracket of a wiper blade 12 is shown. In this region there is located a connecting element 18, often a rivet or a roll rivet, that connects the body of connecting piece 10 with wiper blade 12. At the sides, box region 15 has various bored holes 21 that may have a border.

Figure 3 shows a hook-shaped wiper arm end. It has a hook-shaped 180° bend having radius R.

Figure 4 shows an inventive connecting piece 10 and a pin-type wiper arm end 11b. Pin-type wiper arm end 11b has a pin 24 that in the installed position lies parallel to the windshield and perpendicular to wiper arm 11, and whose diameter is diminished in a suitable segment.

The body of connecting piece 10 essentially has two side walls 30 that are held by three cross-connecting pieces 27a, 27b, and 27c, and that receive and support wiper blade 12 (see also Figure 8).

On the front side, facing away from wiper arm 11, of the connecting piece, side walls 30 extend beyond cross-connecting pieces 27a, b, c, and are terminated by raised parts 33. This results in a clamp-type projection 31 that is used to arrest hook-type wiper arm ends 11a.

Upper surface 27a is curved downward in the front region of the body, forming a radius 36.

On its lower side, which in the installed state faces the windshield, the connecting piece has a transverse groove 37 that tapers upward and that terminates with a cylindrical opening 38 that receives connecting element 18 of wiper blade 12.

In the rear region, facing the wiper arm, connection piece 10 has, on its side facing windshield 13, slots 40 in lateral walls 30, so that lower surface 27b is supported only by thin crosspieces 39, and thus forms a flexible plateau.

The direction of slots 40, and thus the direction of crosspieces 39, is usefully selected such that when connecting piece 10 is removed from wiper arm 11a, the adhesion of wiper arm 11a to lower surface 27c effects an increase of the contact pressure of lower surface 27c on wiper arm 11a.

This is achieved in that when connecting piece 10 is withdrawn from wiper arm 11a,

the lowest surface 27c is moved slightly forward through its adhesion to wiper arm 11a. The angle of crosspieces 39 to the wiper arm, and thus the distance between upper surface 27a and lower surface 27c, is increased slightly by this, increasing the contact pressure of surface 27c against the bent over end of wiper arm 11a.

In order to limit flexibility, flexible region 41 has stops 44 that prevent crosspieces 39 from breaking off.

Above plateau 27c, connecting piece 10 has a hole 43 that extends through it transversely between the upper surface and the center surface. This hole 43 receives a pin-arm wiper arm 11b.

For this purpose, center surface 27b is interrupted by a tongue-type clip 45 that extends from transverse groove 37 to behind hole 43, and that reduces the diameter of hole 43 inside the body of connecting piece 10. Clip 45 is bent upward behind hole 43, and subsequently has a pressure surface 48 that runs in parallel alignment to upper surface 27a.

If pin 24 of a pin-type wiper arm end 11b is now introduced into opening 43, clip 45 is first bent downward so that it will then snap upward, due to the diminished diameter, when pin 24 is located in the desired position, thus snapping wiper arm 11 into place.

On the upper surface, the connecting piece has two openings 52 that can be used to fasten an adapter 55.

In Figure 5, a connecting piece 10 having a hook-type wiper arm end 11a is shown in the installed position.

Figure 6 likewise shows a connecting piece 10 according to the present invention having a wiper arm 11a, but here wiper arm 11a has a larger radius R than in Figure

5. For this reason, the bent-off end slides under flexible plateau 27c, and presses this plateau slightly upward if necessary. Here the arresting via raised parts 33 of connecting piece 10 can be seen clearly.

Figure 7 shows a connecting piece 10 according to the present invention together with an adapter 55 and a strip-type wiper arm end 11c. Adapter 55 essentially has a long and a short longitudinal brace 58, 59, connected with one another by a transverse brace 62 in such a way that a fork-type structure results.

Figure 9 shows adapter part 55 in a sectional view. The long upper longitudinal brace 58 has on its lower side, in the front region facing connecting piece 10, an arresting tongue 65, to whose end teeth 68 are attached that arrest adapter 55 in openings 52 of connecting piece 10. On the side of adapter 55 facing wiper arm 11, there is located an arm receptacle 71 made up of an opening and an arrest hole 74. Arm receptacle 71 is fashioned in such a way that a strip-shaped wiper arm 11c can be inserted and is arrested via a wiper arm peg 77 that snaps into arrest hole 74.

In the connection of adapter 55 with connecting piece 10, short longitudinal brace 59 is inserted into the area between center and lower surfaces 27b and c. Long longitudinal brace 58, having arrest tongue 65, of adapter 55 slides forward on upper surface 27a of connecting piece 10. In the snapped-in state, teeth 68 engage in openings 52.

It is also possible to attach an arrest pin to the lower side of short longitudinal brace 59; in the snapped-in state this bolt snaps into a hole located in the flexible plateau, i.e., surface 27c.

What is claimed is:

1. A connecting piece (10) for connecting a wiper blade (12) with a wiper arm (11), having a body that can be connected with a wiper arm end (11a,b,c), and having means (30) for receiving and supporting the wiper blade, means (36) for receiving hook-shaped wiper arm ends (11a), and means (43) for receiving pin-type wiper arm ends (11b),
wherein the connecting piece (10) has at least one additional means (52) for receiving another wiper arm end (11c).

2. The connecting piece (10) according to Claim 1,
wherein the other wiper arm end (11c) is fashioned in the shape of a fork.

3. The connecting piece (10) according to Claim 1,
wherein the other wiper arm end (11c) is a strip-shaped wiper arm end (11c) having pegs (77) in connection with a fork-shaped adapter (55) that faces the connecting piece (10).

4. The connecting piece (10) according to Claim 1,
wherein the connecting piece (10) has a flexible region (41) that is fashioned as a plateau (27c).

5. The connecting piece (10) according to Claim 4,
wherein the means (30) for receiving and supporting the wiper blade (12) that bear the plateau (27c) have slots (40), in such a way that a springy cross sectional structure arises that is formed by at least one crosspiece (39).

6. The connecting piece (10) according to Claim 4,
wherein the plateau (27c) lies in a plane to which the at least one crosspiece (39) has an angle of less than 90°.

7. The connecting piece (10) according to Claim 1,
wherein the at least one flexible region (41) has stops (44) for limiting the flexibility.

8. The connecting piece (10) according to one of the preceding claims,
wherein the means (30) for receiving and supporting the wiper blade (12) has a hole (43) that extends through it in transverse fashion, an elastic clip (45) being located in an opening formed by the hole (43).

9. The connecting piece (10) according to one of the preceding claims,
wherein the body has at least one clamp-type projection (31) that can be used to arrest a wiper arm end (11a).

Abstract

Connecting piece 10 for connecting a wiper arm 11 with a wiper blade, having three different fastening systems for wiper arms 11, so that a multiplicity of wiper arms 11 can be received.

(Fig. 7)

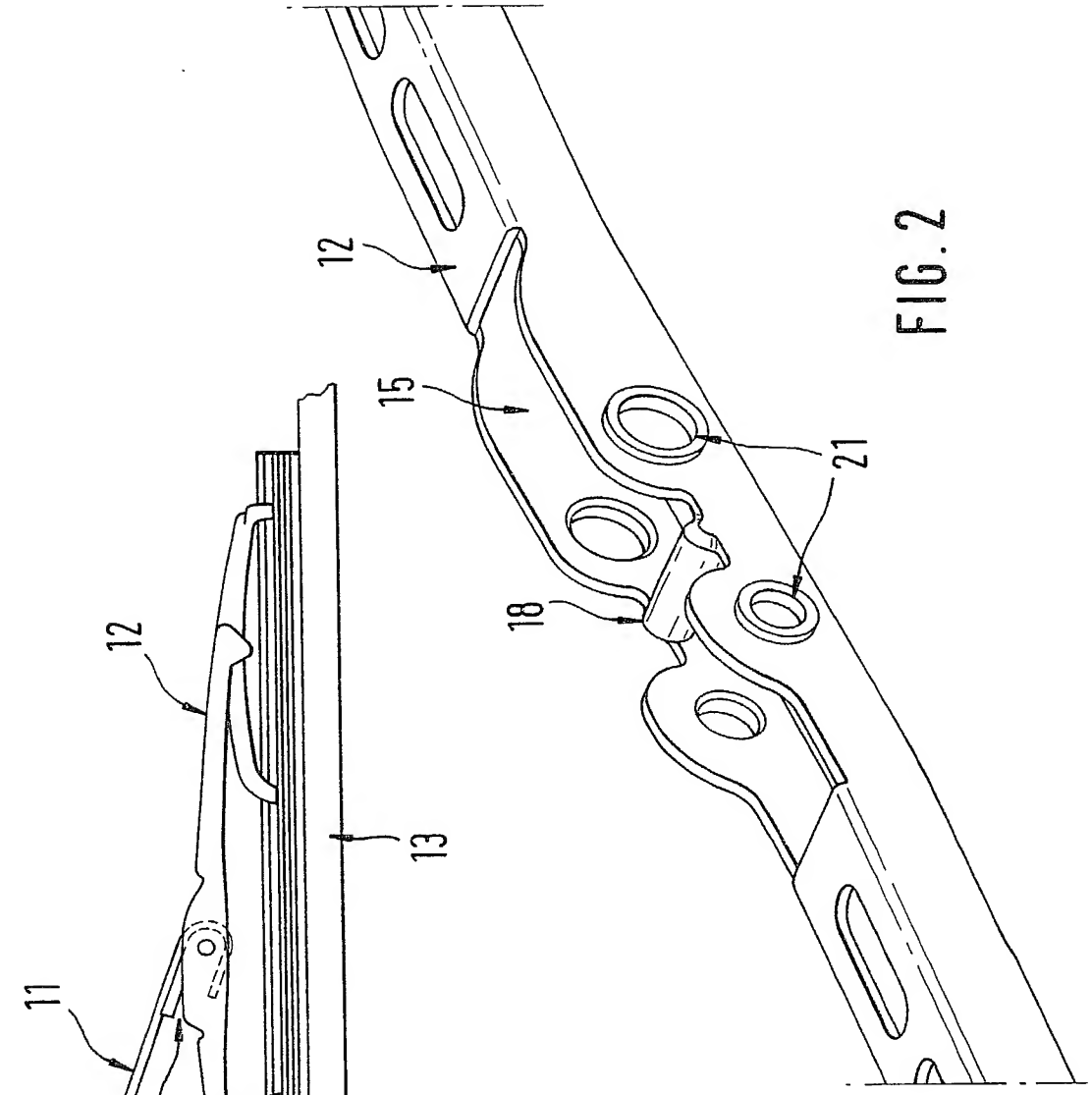


FIG. 2

FIG. 1

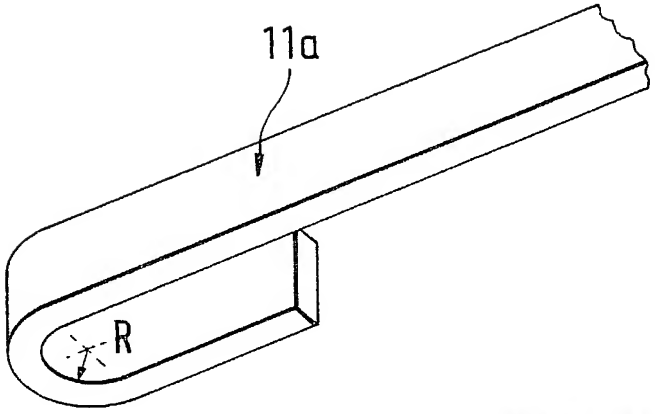
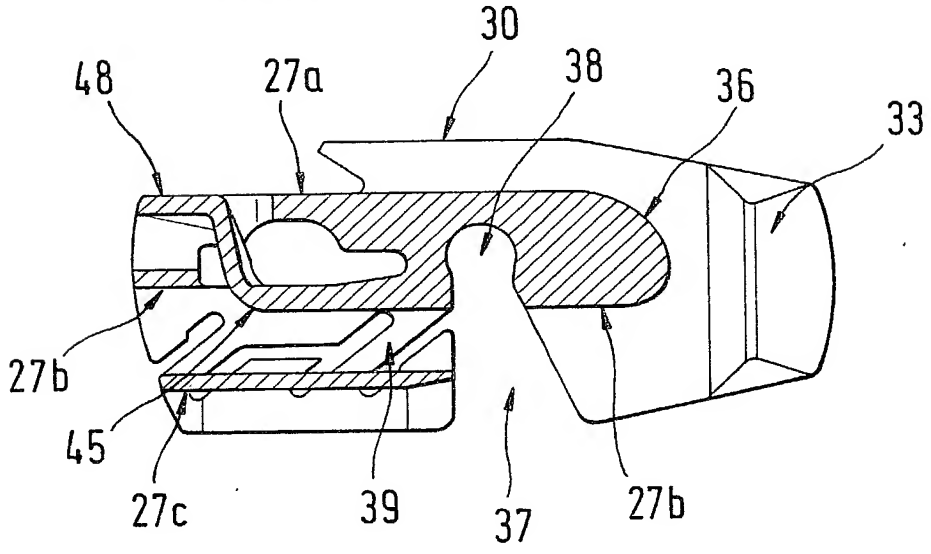


FIG. 3

FIG. 8



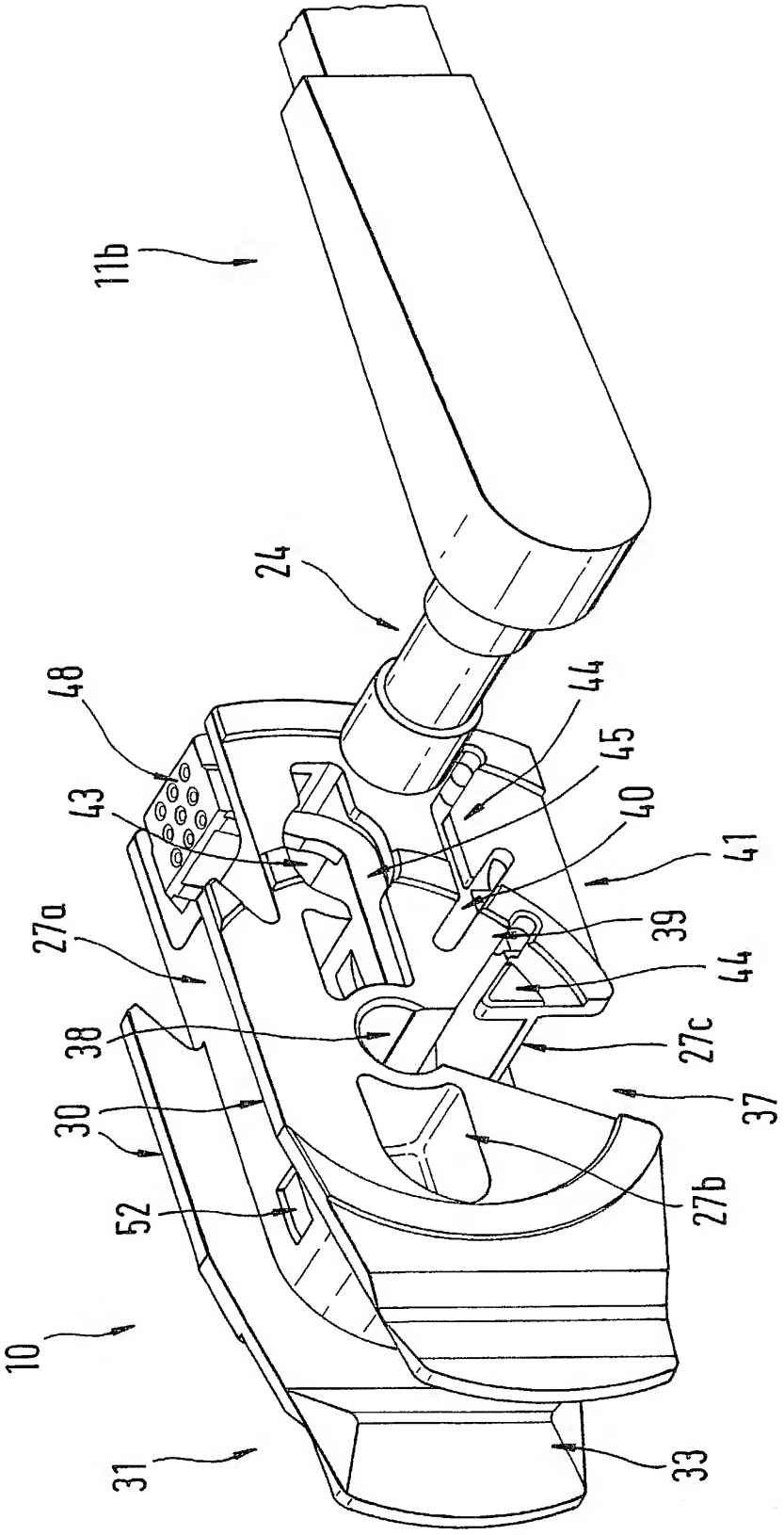


FIG. 4

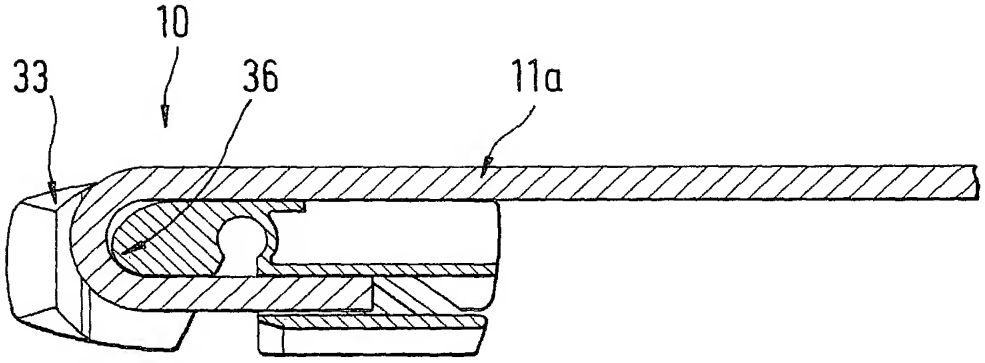


FIG.5

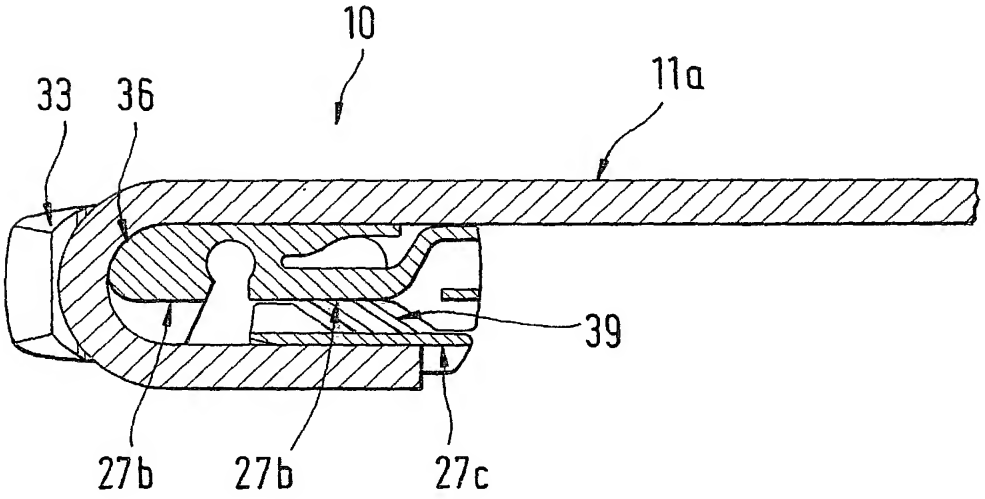


FIG.6

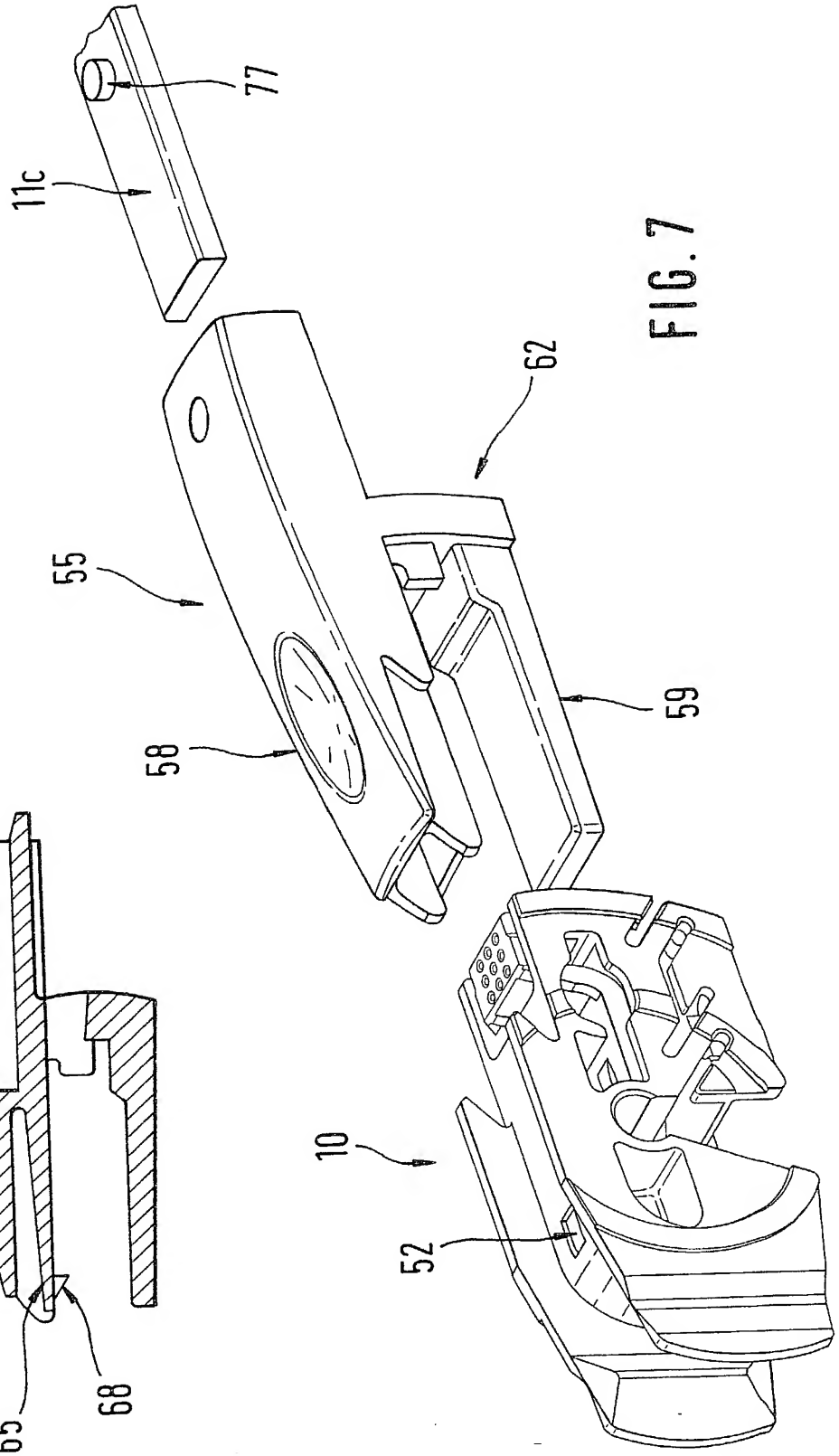


FIG. 7

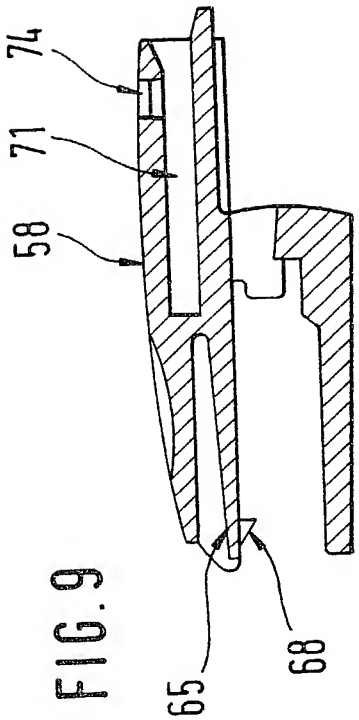


FIG. 9

10191/2243

COMBINED DECLARATION AND
POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **CONNECTING PIECE FOR CONNECTING A WIPER BLADE WITH A WIPER ARM**, and the specification of which:

[ ] is attached hereto;

[ ] was filed as United States Application Serial No. _____ on _____, ____ and was amended by the Preliminary Amendment filed on _____, ____.

[X] was filed as PCT International Application Number PCT/DE00/02637 on the 8th day of August, 2000.

[X] an English translation of which is filed herewith.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international applications(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the

EL828246527US

application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S)
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119

Country : Germany

Application No. : 199 41 459.9

Date of Filing: August 31, 1999

Priority Claimed
Under 35 U.S.C. § 119 : [X] Yes [ ] No

I hereby claim the benefit under Title 35, United States Code § 120 of any United States Application or PCT International Application designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations § 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR
PCT INTERNATIONAL APPLICATIONS
DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. § 120

U.S. APPLICATIONS

Number :

Filing Date :

PCT APPLICATIONS
DESIGNATING THE U.S.

PCT Number :

PCT Filing Date :

I hereby appoint the following attorney(s) and/or agents to prosecute the above-identified application and transact all business in the Patent and Trademark

Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of inventor Jurgen ROEKENS

Inventor's signature _____ Date 28.05.02

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